PURCHASING GREEN TRANSPORT AND LOGISTICS SERVICES: IMPLICATIONS FOR SMALL BUSINESS

by *Pietro Evangelista, Maria Huge-Brodin, Karin Isaksson, Edward Sweeney*

1. Introduction

Environmental sustainability has assumed a growing importance as a result of increasing of global warming and scarcity of some critical resources. Moreover, the recent economic crisis has accelerated the need for sustainable growth in which the better use of natural resources is a prerequisite for developing a sustainable economy. The impact of corporate activities on the natural environment is one of the areas to which governments and international institutions are paying more attention. In this scenario, companies are required to reduce the negative environmental impact of the activities they carry out. Purchasing is seen as an important function to reduce the environmental impact of business activities along the supply chain (Zsidisin and Siferd, 2001). The incorporation of environmental concerns into purchasing activities contributes not only to the improvement of overall company performance (Green et al., 1996; Carter et al. 2000) but it may have positive effects on greening the supply chain through supplier involvement and cooperation (Theyel, 2001; Klassen and Vachon, 2003; Vachon and Klassen, 2006; Hollos et al., 2010). Nevertheless, most of the existing studies have focussed on product suppliers rather than service suppliers. Among the latter, third party logistics service providers (3PLs) are known to make a substantial contribution to environmental degradation with transport and logistics activities contributing significantly to greenhouse gas emissions at global level (World Economic Forum, 2009). For this reason, it is important to incorporate green considerations into purchasing decisions when companies source transport and logistics services (Foerstl et al., 2010).

In facing sustainability challenges, small buyer firms generally show a reactive approach. A reason is that green efforts require human and financial resources to be dedicated to sustainability (Luken and Stares, 2005). In addition, such companies often have little know-how concerning the practices required in managing the environmental impact of transport and logistics activities (Schaper, 2002). Considering the large proportion of small

firms operating in the market this may result in a bottleneck that prevents the achievement of the goal of a greener supply chain (Lee, 2008). Despite this, little research has been conducted on purchasing green transport and logistics service (Wolf and Seuring, 2010) and much remains to be learned concerning buyers' practices when sourcing more sustainable services from 3PLs, particularly in the case of small buyer firms.

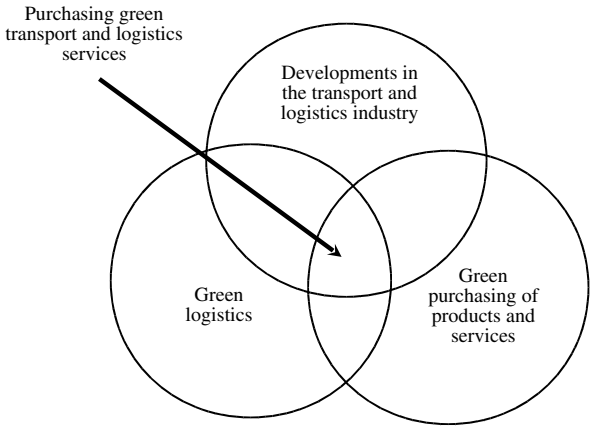
The aim of this paper is to explore buyer practices in purchasing green transport and logistics services through an analysis of six case companies in Italy, Ireland and Sweden. This allows managerial implication - particularly for small buyer companies – to be drawn and the identification of future research avenues in this field.

This introduction is followed by a literature review on green purchasing of products and services, green logistics and recent developments in the transport and logistics service industry. The third section provides a description of the methodological approach adopted. The results of the case study analysis are presented in the fourth section and discussed in section five. In the concluding section, managerial implications and future research avenues are outlined.

2. Literature background

Considering that little research has been conducted into the purchasing of green transport and logistics services, the background literature of this paper relies upon the three following streams: green purchasing of products and services; green logistics; and, developments in the transport and logistics service industry. As result the contribution of this paper is placed in the intersection between these three areas as shown in figure 1.

Fig. 1 The literature background of the paper



2.1 Green purchasing of products and services

The greening of purchasing can yield higher profitability, which is an important reason why the topic has received increased attention over the past decade. For example, Carter et al. (2000) shows that environmental purchasing can lead both to increased net income and lower costs, thus promoting improved firm performance. In previous research into green purchasing the main efforts have been directed towards private purchasing, as opposed to public purchasing (Walker et al. 2008). When in its infancy research on green purchasing focussed mainly on product suppliers, with the focus having shifted somewhat to include services more recently. However, research on the purchasing of transport services is still scarce (Björklund, 2011).

Common drivers in green purchasing are regulatory compliance, customer pressure, risk minimisation and monitoring of green performance (Walker et al., 2008). An investigation by Björklund (2011) among Swedish purchasing managers reveals that management, customers and carriers are among the most influential factors for greening the performance of purchasing. The barriers to greener purchasing seem to vary depending on specific cases, but costs and lack of resources are commonly cited (Walker et al., 2008).

In green purchasing, supplier evaluations of different types are important (Zsidisin and Siferd, 2001) and efficient tools can be helpful in the evaluation process. Large et al. (2011) suggest that a high level of supplier assessment influences environmental performance. More specifically, Foerstl et al. (2010) argue that risk assessment is crucial in assessing suppliers from a sustainability perspective, and hence risk assessment capability becomes a key to success. While environmental assessment of suppliers has grown in importance in recent years, there is still a lack of tools that facilitate the assessment of suppliers. One example is a benchmarking tool, which can support companies in improving their environmental considerations in purchasing (Björklund 2010).

According to Zsidisin and Siferd (2001), suppliers should not only be evaluated, but that supplier development should also be part of green purchasing. According to an investigation by Carter and Jennings (2002), socially responsible purchasing (including green dimensions) is associated with commitment to suppliers, trust building between the buyer and supplier, and also to supplier performance in general. Hollos et al. (2010) suggest that cooperation between the purchasing organisation and their suppliers is crucial in order to green the purchasing process, and this also enhances the firm performance significantly. Working with sustainable supplier development can also be seen as a way to reduce the environmental risk in supplier relationships, something which should also have positi-

ve effects on operational costs and overall competitive advantage (Foerstl et al., 2010). In addition, Large et al. (2011) suggest that green collaboration with a supplier supposedly influences the environmental performance of the supplier (Large et al. 2011).

2.2 Green logistics

Research in the field of green logistics identifies several ways for companies to reduce the environmental impact of transport and logistics activities, including: modal changes and intermodal solutions (McKinnon, 2010a; Woodburn and Whiteing, 2010); advances in technology solutions (McKinnon, 2010b); tools for assessing the carbon footprint of activities (Eglese and Black, 2010; Lieb and Lieb, 2010; McKinnon, 2010c; Piecyk, 2010); green transport management (Lieb and Lieb, 2010); and, green logistics system design (Aronsson and Huge-Brodin, 2006; Kohn and Huge-Brodin, 2008; Harris et al., 2010).

However, as noted by Wolf and Seuring (2010), the role of the 3PL industry in the development of green logistics systems has been on the periphery of green logistics research to date. Some exceptions are the work of Lieb and Lieb (2010) based on a global survey of key developments in the sector, and Wolf and Seuring (2010) with their focus on the procurement and supply of green transport and logistics services. These contributions highlight the importance of information sharing between suppliers and buyers and the fact that customer pressure has been the main driver in the process of greening 3PLs. While Lieb and Lieb (2010) note a greater acknowledgement of the importance of environmental sustainability among 3PLs, Wolf and Seuring (2010) point out that there is little evidence of concrete green initiatives being undertaken by 3PLs. Maack and Huge-Brodin (2010) highlight the potential for 3PL firms to better use their physical, human and other resources for developing green initiatives. More recently, Evangelista et al. (2011) suggest that a key focus of ongoing research needs to be on exploring how the perceptions of the 3PL sector align with those of their customers - i.e. the buyers.

2.3 Recent developments in transport and logistics service industry

In recent years a number of driving forces have affected the logistics service industry, creating new strategic challenges and opportunities for logistics service companies. For many 3PL companies the main changes associated with the evolving industry scenario consisted of a transition from a single-activity company toward a business model based on providing a wider range of integrated services (Ashenbaum et al., 2005). The expansion of the range of services offered is reflected, on the one hand, in the

commoditisation of core service offerings (e.g. transportation) and, on the other, the provision of value-added services and technological capabilities as points of differentiation (Evangelista, 2011).

This has given 3PLs the opportunity to penetrate segments of supply chains with higher added-value services compared to traditional transportation and warehousing services. The transition from the traditional "arms length" approach to the supply of integrated logistics services packages on a "one-stop shopping" basis (Panayides, 2005) has facilitated the evolution of 3PL companies from playing their traditional tactical roles to become adaptive supply chain service providers. As a result, 3PLs play a more important role than in the past. In this changing process, environmental sustainability is a challenging area for 3PLs as these companies have to face two different pressures. The first relates to transportation costs due to rising fuel prices. This is leading 3PLs to implement cost-cutting initiatives such as the optimisation of transport network (van Hoek and Johnson, 2010). The second comes from buyer side (Foster, Sampson and Dunn, 2000). Manufacturers and retailers are investing an increasing amount of resources in accomplishing their environmental objectives. As a result, 3PLs are required to improve their sustainability competencies in order to support the environmental strategies of their customers. As the importance of green supply chain initiatives is likely to grow in the near future, it is reasonable to expect that the criteria for selecting 3PLs will be increasingly based on the evaluation of their sustainability practices and performance.

2.4 Summary of the literature review and research questions

A number of interesting findings emerge from the authors' review of the three streams of literature presented above. Firstly, the literature on green purchasing of products and services highlights that management commitment to green issues is important for the development of more sustainable purchasing processes. This suggests that the overall company environmental concerns should have a positive influence on greening purchasing processes including the purchasing of more sustainable transport and logistics services. Moreover, supplier evaluation and cooperation are crucial to increasing the environmental sustainability of purchasing processes and supplier performance. Secondly, the literature on green logistics reports contrasting evidence about the concrete adoption of sustainability initiatives by 3PLs. 3PL company size seems to have a role in the sense that larger 3PLs appear to have a more prominent green culture (reflected in, for example, planned initiatives) in comparison with smaller companies. Moreover, the alignment between 3PLs and buyer companies in relation to the perception of the importance of green issues seems to have a role in triggering collaborative initiatives.

Thirdly, the evolution of the logistics service industry and the more critical role played by 3PLs in the supply chain indicates that buyer companies could receive appropriate support from 3PLs in successfully exploiting their environmental strategies and initiatives. In addition, this should facilitate the purchasing of more green transport and logistics services through cooperation on green projects.

The literature review presented above allows the following research questions to be posited:

RQ1: Are the general environmental ambitions of the surveyed companies reflected in the purchasing of greener transport and logistics services and, if so, in which ways?

RQ2: How is the sourcing of green transport and logistics services influenced by the environmental concerns of the purchasing function in the surveyed companies?

RQ3: Are there collaborative projects between the surveyed companies and their 3PLs aimed at greening transport and logistics services?

3. Research Methodology

The purpose of the research described in this paper is to improve the understanding of buyer practices when purchase green transport and logistics services. The paper takes the buyer's perspective, and it is of an exploratory character given the relative dearth of literature in this area. To generate fresh perspectives and to gain deep insights into this issue, the authors conducted interviews with managers from one Swedish, three Italian and two Irish buyer firms. The summary profile is reported in table 1.

Table 1. Company profiles

	SWE1	ITA1	ITA2	ITA3	IRL1	IRL2
Type of product	Sports and leisure wear, sports equipment	Coffee	Functional products and food integrators	Frozen food	Consumer foods	Electronics

continues...

...continues

Company system description	Retail chain: global supply, distribution centre, over 100 outlets	Coffee makers controlling the downstream part of the supply chain (bars) through 100 sales agents.	Design and marketing of product and coordination of outsourced manufacturing and distribution channels	Product processing. Logistics and merchandising outsourced but controlled by internal staff	Supply from factories to distribution centres for large retail and direct to store for smaller customers	Regional distribution centre supplying customers
Geographical market	Nordic countries	Domestic (90% of turnover) and foreign (10% of turnover)	Domestic	Domestic	Britain and Ireland (some in continental Europe)	Europe, Middle-East and Africa (EMEA)
Size	Large	Small	Micro	Large	Large	Large

This is not meant to be a definitive sample, nor are we implying that the sample can be generalised to all professionals and industries. Instead, it provides examples of how the issues under investigation are being addressed in the surveyed companies.

This sample of companies handles a wide variety of product groups thus enabling the authors to generate a breadth of perspectives. Individual respondents are senior managers with specific responsibility for the procurement of transport and logistics services.

The research has been conducted through semi-structured interviews with each respondent. Each interview was guided using a data collection guide developed by the authors. It comprises four parts. The first dealt with the main characteristics of the company including turnover, employees, geographical market covered, type of products, and the supply chain role covered. The second concerned the overall company environmental concern and importance. The third was focused on environmental concern in the purchasing function, while the last section investigated green concern in purchasing transport and logistics services specifically.

This allowed the interviews to be based primarily on specific topics of interest in the research but provided interviewees with some latitude in how they would respond to the questions. Most interviews deviated from the precise questions based on responses given by the interviewees. Interviews were recorded and transcribed.

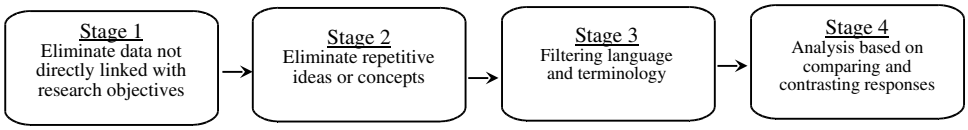
The interviews were held during face-to-face meetings and integrated follow-upwith phone calls to clarify or get in-depth knowledge on specific issues. In most cases, at least two managers with different responsibilities in the company participated in the meetings in order to get different views

about the topics investigated. As indicated in table 1, all companies interviewed show a strong focus on the domestic market (excluding IRL2) and exercise control over downstream part of the supply chain.

The analysis of interview transcripts followed the two approaches suggested by Easterby-Smith et al. (2008): content analysis and grounded analysis. The former involves interrogating the data for constructs and ideas that have been decided in advance. The latter involves letting the data "speak for itself" thus allowing for more intuition in guiding the researcher towards an understanding of the data. The authors adopted a combination of both approaches, thus integrating the strengths and mitigating the shortcomings of the two alternatives.

The transcript analysis employed by the authors (as shown in Figure 2) involved four main stages in distilling the raw transcript data into information based on comparing and contrasting the main issues set out by respondents.

Fig. 2 The transcript analysis process



Stage 1 reflects the advice of Robson (2003) that good transcript analysis has to be aimed squarely at answering the research questions asked or addressing the overall research objectives. Stage 2 reflects the fact that repeated use of a particular word or phrase by a single respondent can not be logically considered to imply that the concept in question is necessarily of particular importance beyond the specific environment in which that respondent is based. A considerable amount of time was spent during the interviews in clarifying terms used by respondents to ensure that the authors were absolutely sure of the intended sense of the terminology used. This is particularly important in the SCM field where a large number of metaphors are used to describe concepts. Stage 3 (essentially a 'filtering' process) addressed this issue and was carefully considered during the planning and execution of the interviews. The final stage involves the analysis of data based on comparing (i.e. identifying key elements of similarity or convergence) and contrasting (i.e. identifying key elements of difference or divergence) the main issues set out by respondents.

The main results of the case study analysis are summarised in the tables presented in the following section and indicate the use of a variety of emphases and approaches in respondents' firms.

4. Main results of the case study analysis

This section reports the main findings emerging from the case study investigation. Initially, the general environmental concern of the investigated companies is analysed, and their environmental orientation in overall purchasing is then described. The section ends with an analysis of the environmental concern when transport and logistics services are purchased.

The overall environmental concerns among the buying companies (summarised in Table 2) vary, from "of growing concern but not part of core business" (SWE1) to very important, described in terms of "key driver in company decisions" (ITA2) and "very high priority" (IRL2). Production, purchasing and logistics are the functions that are often mentioned as main sources of environmental stress. All companies pay internal attention to environmental issues, while only some of these companies also are active externally.

Table 2. Company environmental concern

	SWE1	**ITA1**	**ITA2**	**ITA3**	**IRL1**	**IRL2**
Importance of green aspects today	Of growing concern, but not part of the core business	Important but does not play a key role in orienting company strategy	Important role that drive key company's decisions	Production, HR and logistics/ distribution	High priority but reduced due to recession	Very high priority driven by the managing director
Main functions causing green concern	Production, logistics, HR, new establishments	Production and logistics	Production, HR, marketing and logistics	Production, HR and logistics/ distribution	urchasing, manufacturing, transport and logistics	Purchasing and procurement of components
Mainly internal/ external concern	Mainly internal concern	Mainly internal concern	Mainly internal with some focus on suppliers and 3PLs	Sustainability achieved leveraging internal and external resources	Both	Both

While the companies investigated are similar in some dimensions, they vary in others. What is most common is that there is a general environmental concern and they include internal matters in their environmental concern.

The next level is to capture how the different companies consider the role of environmental sustainability in the purchasing function in general, which was previously mentioned by some of them as important. The literature review also indicated that green purchasing may lead to increased net income and cost reductions, which in turn can generate improved firm performance (Carter et al., 2000). As with general environmental aware-

ness, purchasing environmental awareness varies among the companies as shown in Table 3. All the surveyed companies were asked to indicate which main aspects they address in green purchasing, and the range of aspects is again wide. While some of them are quite specific about transport and supply (SWE1, ITA3 and IRL2), others are on a more general level (ITA1 and IRL1), while ITA2 is focused on packaging materials. In the literature, different types of supporting tools are considered important in the supplier evaluations process.

Furthermore, Large et al. (2011) suggest that a high level of supplier assessment can also influence environmental performance. Despite this important fact there seems to be a lack of tools concerning environmental considerations in purchasing. This scenario is also reflected among the case companies studied. All but one (IRL2) lack tools that support environmental concern in purchasing. In order to green the purchasing process, Hollos et al. (2010) stress the crucial role of cooperation between the purchasing organisation and its suppliers. Regarding joint development with suppliers among the companies studied, the most common item seems to be packaging issues of various kinds (ITA1, ITA2 and IRL1), while both SWE1 and IRL2 support more long-term capability-based projects. Joint sustainability development with suppliers can reduce environmental risk in the specific relationship that in turn can have positive effects on operational costs and competitive advantage (Foerstl et al., 2010) as well as a way to influence and improve the environmental performance of the supplier (Large et al., 2011). However, none of the companies studied have made joint investments with their suppliers.

Table 3. Environmental concern in the purchasing function

	SWE1	**ITA1**	**ITA2**	**ITA3**	**IRL1**	**IRL2**
Main aspects addressed	Suppliers and transport. General overall sense rather than specific aspects.	Low environmental awareness of suppliers limit the adoption of measures	Increase recycle material for packaging	Reduce impact of raw material procurement	General increase in awareness of green in purchasing function	Green procurement of physical inputs
Supporting tools	None	None	None	None	Not formalised	Green dimension built into supply assessment
Joint development with suppliers	Product functionality	Joint project on using a more sustainable packaging	Joint project for design of recyclable packaging	None	Sustainable packaging by packaging suppliers	Joint training and development courses

Table 4 reports the results relating to the environmental concern of the surveyed companies when they source transport and logistics services. The first element investigates the importance attributed to green aspects when transport and logistics services are purchased. All the surveyed companies indicated that environmental aspects are important but, excluding ITA3, green aspects are not considered as a key criterion for buying transport and logistics services. The low priority assigned to green aspects is reflected in a number of other elements. The aspects that 3PLs are asked to be addressed mainly relate to ensuring that minimum legal and emissions requirements are addressed. The organisation of the work between buyer and 3PL shows a limited amount of human resource involved without a specific professional profile committed to manage environmental issues. Generally the supervision of green aspects relies upon the responsibility of the logistics/supply chain manager or supervisory team visiting the 3PL's site periodically in order to check how green requirements are managed. There is a little use of supporting tools in purchasing transport and logistics services in the surveyed companies. However, one company (IRL1) mentioned that there was a general statement in place even if there were no formal supporting tool. Another company (SWE1) alluded to a tool developed by industry members in order to meet demands from 3PLs for standards.

Table 4. Environmental concern in purchasing transport and logistics services

	SWE1	**ITA1**	**ITA2**	**ITA3**	**IRL1**	**IRL2**
Importance of enviromental aspects Vs. others	Green is a knock-out criterion for the providers to be considered. Price, quality, safety are more important.	Important, but price and reliability are key decision aspects	Very important. The company is willing to pay a premium to buy more green 3PL services.	Important, but price, quality and reliability of services are the main criteria	Green considered in the overall supplier assessment but based on defined minimum standards	Low priority. Logistics function responsible for buying transport and logistics while purchasing function dealing with contractual and transactional issues.
Main aspects addressed	Legal aspects, drivers' behaviour, technology standards, equipment management, green policy	Green policy of the logistics providers and actions to reduce emissions	Green certification and use of recyclable packaging	No specific aspects arae defined	Minimum standards (emissions) defined (not very exacting) and minimum legal requirements met	None beyond compliance with legal minimum requirements

Organisation of the work	Manager reports to Managing Director. Tactical plan present. Logistics manager responsible for green issues	Supervisory environmental team visits 3PLs to check green management	Team supervising green management of 3PLs	Meeting involving the company logistics manager and 3PL managers	SC Manager (reporting to Operations Director) is responsible	Logistics Manager (with support from purchasing function)
Who drives?	Distribution is joint concern (DC up to company and supply to 3PL)	Buyer ask for environmental issues and 3PL react	Logistics function interact with 3PL to request green service	The company asks 3PL for green service	Buyers demand and 3PL react	In some cases the buyer and in some other the 3PL depending on the product and market

Almost all the surveyed companies take the initiative in specifying green requirements for transport and logistics services and generally 3PLs react. In the case of SWE1 there is a shared responsibility in managing green issues. IRL2 provides a different example where it is the buyer or the 3PL who take the initiative depending on the type of product or the market. As mentioned earlier, the companies under investigation evaluate their 3PLs based on green considerations to some extent. However, Zsidisin and Siferd, (2001) stress that supplier evaluation only may not be enough; the authors also highlight supplier development as an important part of green purchasing. This effort can be crucial in order to green the purchasing process and lead to a positive effect on firm performance (Hollos et al., 2010). However, the empirical data show a low level of cooperation between buyer companies and their 3PLs. This in turn indicates the low level of importance attributed to green issues in transport and logistics. Joint developments and investments with 3PLs among the companies studied are rare. When collaborative deals have been set up they concern energy efficiency (SWE1) and modal shift (ITA3).

The low importance of green issues in buying transport and logistics services seems to be conflicting with the role of logistics for the companies surveyed. All the companies declared that logistics has an important role for the company business. This is reflected in the focus on the management of downstream stage of the supply chain and in the collaborative investments that most of the companies have in place.

5. Discussion

When putting the three pictures depicted above together (general environmental awareness; environmental purchasing awareness and environmental awareness in purchasing green transport and logistics services) an overall pattern emerges. While the case study companies show a relatively high concern for green issues at company level, the importance of green issues decreases looking at the purchasing function, which is manifested through either very focused efforts, or very general statements. When green concerns in purchasing transport and logistics services are analysed the level of importance decreases dramatically. A clear misalignment is evident between overall company policy and the practices adopted in the purchasing of transport and logistics services. The sample of companies does not provide any specific insights into how small companies come out in the evaluation compared to large companies.

This overall pattern is reflected in the literature; while the general environmental awareness and concern has increased, the attention paid to purchasing green transport and logistics services is very low (e.g. Wolf and Seuring, 2010; Björklund, 2011). It is also evident, that the purchasing of green transport and logistics services has not yet become a well diffused practice, which is reflected in the hesitant attitude of 3PLs in adopting initiatives for greening their service offerings (Evangelista et al. 2012).

In summary, this area needs much more attention and the adoption of good practice needs more models and tools to support the greening of transport and logistics purchasing. Researchers will need more substantial evidence of how this can be accomplished in practice.

6. Conclusions and implications

While company mission statements often stress the "green attitude" of companies, environmental sustainability does not directly involve the purchasing function in general, and the purchasing of transport and logistics services particularly. This in turn suggests that the efforts of companies towards more sustainable manufacturing initiatives are generally used for advertising reasons rather than to reduce the environmental impact of the company activities.

Based on the findings achieved in relation to the attitude of the purchasing function to greening transport and logistics services, it is clear that there is potential for improvement especially in the area of green collaboration between buyer and supplier. Few joint developments and investment projects exist regarding green purchasing in general and green purchasing of transport and logistics service between the buyer companies investiga-

ted and their 3PL suppliers specifically.

The low priority assigned to joint sustainability initiatives with little commitment in green collaborative initiatives appears particularly challenging for small buyers. In order to reduce the environmental impact of their supply chains, these firms should enhance green procurement and stimulate their transport and logistics suppliers in developing collaborative initiatives. Through collaboration with other suppliers (in, for example, buying cooperatives) the size of the counterpart as well as enhanced buyer competence should reduce and share the risk associated with specific resource investment in the area of green logistics.

On the other side, this should help to overcome the hesitant attitude of 3PL partner companies to the adoption of initiatives for greening the services they provide. However, more research is needed in order to investigate how buyer companies and their 3PL suppliers can work more closely, what they can learn from each other and how they can improve each others' environmental activities. This is an area that needs to be improved in the future in order to improve the environmental sustainability of transport and logistics services.

The results of this paper are in line with the results of research carried out by the authors (Evangelista et al., 2011) where the lack of buyers' commitment in collaborative green initiatives has been indicated as a barrier by 3PL companies. This forces 3PLs to be engaged in tactical initiatives (point solutions) involving some supply chain functionalities only (e.g. vehicle utilisation and energy efficiency) rather than to develop a more strategic end-to-end green supply chain view. There is a clear lack of alignment between buyers and 3PLs in the environmental sustainability field. In order to overcome this situation it is necessary that buyers innovate their approaches when sourcing transport and logistics services through enlarging the areas of collaboration with 3PLs, including packaging design, supply chain re-organisation and joint environmental planning and control.

For small buyers particularly, they need to put relatively more effort into improving their sustainability readiness. To achieve this objective two actions may be recommended: increasing the managers' environmental awareness through training and educating staff in every level of the organisation; and, integrating environmental concerns into strategic decision making process.

On the other side, small 3PLs have lower margins for investing in technology, as well as for building competence in the area of green logistics. However, previous research (Isaksson and Huge-Brodin, forthcoming) suggests that the size of 3PLs might not be an obstacle to investing in green solutions. Rather, small 3PLs can be faster in committing resources to green initiatives, as well as profiling themselves as green towards their customers.

Finally, a further critical area of collaboration to improve green supply chain performance is technology.

The low level of adoption of ICT tools in the purchasing function of the buyer companies may be considered as another element that prevents information sharing between buyers and 3PLs on environmental issues. Buyers and 3PLs should jointly invest in green ICT applications that facilitate data exchange and provide increasing visibility on transport and logistics related carbon emissions. For small buyer companies, technology (particularly ICT) is a traditional point of weakness. The recommendation here relates to the possibility for buyer companies to stimulate their 3PL partners to invest in collaborative cross-industry technology platforms that may be able to improve information sharing and coordination without incurring high investment costs.

This is supported by recent literature (see, for example, the work of Wolf and Seuring, 2010) that stresses the importance of environmental development between buyer companies and their 3PL suppliers. However there are no definitive knowledge on how such development could be designed and how these environmental relationships can be realised in practice. The importance of co-ordination and collaboration between buyers and 3PL suppliers regarding environmental sustainability in transport and logistics services is a consideration that not yet has been developed in prior research and calls therefore for further investigation.

7. Acknowledgements

The authors whish to acknowledge the interviewees at the case companies for participating in the investigation. Particularly the authors wish to thank Nicola Borghi, Operations Manager at Due Torri Logistics Partner, for the invaluable contribution provided in the selection process of the Italian case study companies and the interesting discussions had on the role of environmental sustainability in the logistics service industry.

Pietro Evangelista
IRAT-CNR and Department of Management Engineering,
University of Naples Federico II
p.evangelista@unina.it

Maria Huge-Brodin and Karin Isaksson
IEI Department of Management and Engineering, Linköping University
maria.huge-brodin@liu.se, karin.isaksson@liu.se

Edward Sweeney
National Institute for Transport and Logistics,
Dublin Institute of Technology
edward.sweeney@dit.ie

Abstract

Considering its strong environmental impact, logistics plays a critical role in green supply chain management. It provides strategic links in the supply chain and is an essential function in the delivery of green products to the consumer. There is a general consensus on the fact that more environmentally sustainable companies may be achieved only if transport and logistics activities also become greener. To achieve this objective, buyer companies need to incorporate green considerations in the purchasing of transport and logistics services. This appears particularly challenging for small and medium sized enterprises (SMEs) because of their traditional lack of managerial, organisational and financial resources that often result in failure to adopt an environmental perspective. In the extant literature, green purchasing has received increased attention over the past decade and the strategic importance of introducing green aspects into purchasing practices has been recognised. However, little has been written in relation to purchasing green transport and logistics services. The aim of this paper is to explore practices in the buying of green transport and logistics services and to derive implications for small buyer companies. The paper analyses how general environmental company ambitions and environmental purchasing practices are reflected when green transport and logistics services are purchased in three different European countries (Italy, Ireland and Sweden) using a multiple case study research approach. The results of the paper indicate that while the case companies show a relatively high concern for green issues at corporate level, a lower importance is attributed to green issues at the purchasing function level. When green concerns in the purchasing of transport and logistics services are analysed the level of importance decreases further. Thus, a conflicting attitude is evident between the overall corporate level and the purchasing of transport and logistics services specifically. This suggests that there is potential for improvement especially in the area of green collaboration in buyer and supplier relationships.

Riassunto

Considerato il loro rilevante impatto ambientale, le attività logistiche e di trasporto rivestono un ruolo critico per aumentare la sostenibilità ambientale della supply chain. Infatti, il successo delle politiche di sostenibilità delle imprese industriali dipende in misura crescente dall'utilizzo di servizi di trasporto e logistica a basso impatto ambientale. Ciò significa che le imprese che acquistano servizi logistici devono porre una attenzione sempre maggiore alla sostenibilità ambientale di tali servizi. Ciò risulta particolarmente problematico per le piccole e medie imprese (PMI) a causa della loro tradizionale scarsità di risorse manageriali, organizzative e finanziarie che si riflette nella sottovalutazione della variabile ambientale. Nonostante il problema della sostenibilità ambientale degli approvvigionamenti ha ricevuto una attenzione crescente sia dal punto di vista scientifico che della pratica aziendale, pochi sono gli studi che hanno riguardato l'acquisto di servizi logistici e di trasporto sostenibili soprattutto con riferimento alle piccole imprese. Scopo di questo lavoro è di esplorare l'importanza della sostenibilità ambientale nella gestione della funzione approvvigionamenti e nell'acquisto di servizi logistici e di trasporto per identificare quali sono le implicazioni più rilevanti per le imprese acquirenti di piccola dimensione. A tal fine sono stati analizzati e confrontati sei casi aziendali in tre diversi paesi europei (Italia, Irlanda e Svezia). I risultati indicano che nonostante sia emerso un livello di consapevolezza ambientale relativamente elevato per l'impresa nel suo complesso, minore importanza è attribuita alla sostenibilità ambientale della funzione acquisti. Con specifico riferimento all'acquisto di servizi di trasporto e logistica il ruolo e l'importanza attribuita alla sostenibilità ambientale diminuisce ulteriormente. I risultati evidenziano l'esistenza di un atteggiamento incoerente tra il ruolo attribuito alla sostenibilità a livello dell'impresa nel

suo complesso, alle attività di approvvigionamento in generale e all'acquisto di servizi di trasporto e logistica in particolare. Ciò suggerisce che una potenziale area di miglioramento su cui il management delle piccole imprese può intervenire riguarda la collaborazione con fornitori di servizi logistici e di trasporto con i quali dovrebbero essere condivise iniziative, progetti e investimenti in sostenibilità.

Jel Classification: Q56, L91, L11

Keywords (parole chiave): purchasing green transport and logistics services, company environmental ambitions, environmental purchasing function concerns, swedish, italian and irish buyer companies, case study analysis (Acquisto di servizi logistici e di trasporto sostenibili, Ambizioni ambientali dell'impresa, Preoccupazioni ambientali della funzione acquisti, Imprese acquirenti Svedesi, Italiane e Irlandesi, Analisi di casi di studio)

References

Aronsson, H., Huge Brodin, M., 2006. Environmental impact of changing logistics structures, *The International Journal of Logistics Management*, 17(3): 394-415.

Ashenbaum B., Maltz A.B., Rabinovich E., 2005. Studies of trends in third-party logistics usage: what we can conclude?, *Transportation Journal,* Vol. 44(3): 39-50.

Björklund, M., 2010. Benchmarking tool for improved corporate social responsibility in purchasing, *Benchmarking: An International Journal*, 17(3): 340-362.

Björklund, M., 2011. Influence from the business environment on environmental purchasing - drivers and hinders of purchasing green transportation services, *Journal of Purchasing and Supply Management*, 17: 11-22.

Carter, C., Kale, R. and Grimm, C., 2000. Environmental purchasing and firm performance: an empirical investigation, *Transportation Research Part E: Logistics and Transportation Review*, 36(3): 219-228.

Carter, C. Jennings, M., 2002. Social responsibility and supply chain relationships, *Transportation Research Part E: Logistics and Transport Review*, 38(1): 37-52.

Eglese, R. Black, D., 2010. Optimizing the routing of vehicles, in McKinnon et al. (eds.) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, KoganPage: 215-228.

Easterby-Smith, M.P.V., Thorpe, R., Jackson, P., 2008. Management Research: Theory and Research. Sage, London.

Evangelista, P., Huge-Brodin, M., Isaksson, K., Sweeney, E., 2012. The environmental sustainability attitude of 3PLs. Implications for purchasing transport and logistics services. In Folinas D. (ed.) *Outsourcing Management for Supply Chain Operations and Logistics Services*, IGI Global, USA, (in printing).

Evangelista, P., Huge-Brodin, M., Isaksson, K., Sweeney, E., 2011. The impact of 3PL's green initiatives on the purchasing of transport and logistics services: an exploratory study. Proceedings of the 20th Annual IPSERA Conference *Vision 20/20 - Preparing today for tomorrow's challenges*, 10th-13th April, Maastricht, the Netherlands.

Evangelista, P., 2011. *ICT Diffusion in SMEs. An Investigation on the Italian Transport and Logistics Service Industry*, Collana di Ingegneria Economico-Gestionale, No. 43, ESI, Naples, Italy.

Foerstl, K., Reuter, C., Hartmann, E., Blome, C., 2010. Managing supplier sustainability risks in a dynamically changing environment - Sustainable supplier management in the chemical industry, *Journal of Purchasing and Supply Management*, 16: 118-130.

Foster, S.T., Sampson, S.E., Dunn, S.C., 2000. The impact of customer contact on environmental initiatives for service firms, *International Journal of Operations & Production Management*, 20(2): 187-203.

Green K., Morton, B., New, S., 1996. Purchasing and environmental management: implications, policies and opportunities, *Business Strategy and the Environment*, 5, 3.

Harris, I., Sanchez Rodrigues, V., Naim, M., Mumford, C., 2010. Restructuring of logistics systems and supply chains, in McKinnon et al. (eds) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, Kogan Page: 101-123.

Hollos, D., Blome, C., Foerstl, K. Henke, M., 2010. Antecedence and performance implications of supplier coordination for sustainable business practices, proceedings of the 17th EUROMA Conference, paper No. SSC3, June 6-9, Porto, Portugal.

Isaksson, K, Huge-Brodin, M., 2013. Understanding the efficiencies behind logistics service providers' green offerings. Forthcoming in *Management Research Review*, 36(3).

Klassen, R.D., Vachon, S., 2003. Collaboration and evaluation in the supply chain: the impact on plant-level environmental investment, *Production & Operations Management*, 12(3): 336-352.

Kohn, C. Huge-Brodin, M., 2008. Centralised distribution systems and the environment: how increased transport work can decrease the environmental impact of logistics,

International Journal of Logistics: Research and Applications, 11(3): 229-245.

Large, R., Gimenez Thomsen, C., 2011. Drivers of green supply management performance: Evidence from Germany, *Journal of Purchasing and Supply Management*, 17: 176-184.

Su-Yol Lee., 2008. Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives, *Supply Chain Management: An International Journal*, 13(3): 85-198.

Lieb, K. Lieb,, R., 2010. Environmental sustainability in the third-party logistics (3PL) industry, *International Journal of Physical Distribution and Logistics Management*, 40(7): 524-533.

Luken, R., Stares, R., 2005. Small business responsibility in developing countries: a threat or an opportunity?. *Business Strategy and the Environment*, 14: 38-53.

Maack, C. Huge-Brodin, M., 2010. Logistics companies' potential in greening their offered services, in proceedings of the 17th EUROMA Conference, paper No. SSC11, June 6-9 2010, Porto, Portugal.

McKinnon, A., 2010a. Environmental sustainability: a new priority for logistics managers, in McKinnon et al. (eds) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, Kogan Page: 3-30.

McKinnon, A., 2010b. Increasing fuel efficiency in the road freight sector, in McKinnon et al. (eds) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, Kogan Page: 229-241.

McKinnon, A., 2010c. Product-level carbon auditing of supply chains, Environmental imperative or wasteful distraction?, *International Journal of Physical Distribution and Logistics Management*, 40(1/2): 42-60.

Panayides, P.M., 2005. Logistics service provider-client relationships, *Transportation Research Part E (Logistics and Transportation Review),* Vol. 41(3): 179-200.

Piecyk, M., 2010. Carbon auditing of companies, supply chains and products, in McKinnon et al. (eds) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, Kogan Page: 49-67.

Robson. C., 2003. *The Real World Research - A Resource for Social Scientists and Practitioner-researchers*. Oxford, Blackwell Publications.

Schaper, M., 2002. Small firms and environmental management: predictors of green purchasing in Western Australian pharmacies. *International Small Business Journal*. 20(3): 235-51.

Theyel, G., 2001. Customer and supplier relations for environmental performance, *Greener Management International*, 35: 61-69.

Vachon, S., Klassen, R., 2006. Extending green practices across the supply chain: the impact of upstream and downstream integration, *International Journal of Operations & Production Management*, 26(7): 795-821.

van Hoek, R.I., Johnson, M., 2010. Sustainability and energy efficiency. Research implication from an academic roundtable and two case examples, *International Journal of Physical Distribution and Logistics Management*, 40 (1/2): 148-158.

Walker, H., Di Sisto, L., McBain, D., 2008. Drivers and barriers to environmental supply chain management pratices: Lessons from the public and private sectors, *Journal of Purchasing and Supply Management*, 14: 69-85.

Wolf, C., Seuring, S., 2010. Environmental impacts as buying criteria for third party logistical services, *International Journal of Physical Distribution & Logistics Management,* 40(1): 84-102.

Woodburn, A. Whiteing, A., 2010. Transferring freight to 'greener' transport modes, in McKinnon et al. (eds) (2010) *Green Logistics: Improving the environmental sustainability of logistics*, Kogan Page: 124-139.

World Economic Forum, 2009. *Supply chain decarbonisation. The role of logistics and transport in reducing supply chain carbon emissions*.

Zsidisin, G., Siferd, S., 2001. Environmental purchasing: a framework for theory development, European Journal of Purchasing and Supply Management, 7(1): 61-73.